

DRAFT FINAL

POND 207A VISUAL INSPECTION REPORT

**ROCKY FLATS PLANT
SOLAR EVAPORATION PONDS
(OPERABLE UNIT NO. 4)**

**U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado**

**EG&G ROCKY FLATS, INC.
ENVIRONMENTAL MANAGEMENT PROGRAM**

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ADMIN RECORD

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1.0 INTRODUCTION

A visual inspection of the 207 series Solar Evaporation Ponds (Solar Ponds) is required in the Phase I RFI/RI Work Plan for Operable Unit No. 4 (OU4). As described in the Work Plan, the objective of the visual inspection is to identify potential cracks or liner breaches and use the visual survey results to refine planned Phase I borehole locations. Phase I boreholes are intended to be distributed throughout each pond, some in locations observed to be cracked or deteriorated, and some at locations where the liner appears intact. The Phase I Work Plan was written with the assumption that all of the Solar Ponds would be emptied of liquid and sludge, exposing the liners for visible inspection. Developments occurring since Work Plan approval have resulted in a deviation from the planned approach at the Solar Ponds in that only one of the five Solar Ponds has been cleaned out. Pond 207A is the only pond that has been drained and cleaned.

Pond 207A was accessible for the visual inspections that occurred on December 9, 1992 and February 26, 1993. Two visual inspections of the pond were conducted because ice and snow, which covered the northeastern one-third of the pond in the December inspection, melted in mid-February and exposed nearly all the remaining liner for the second inspection. The results of the visual survey were supplemented with a pilot geophysical survey in Pond 207A using Ground Penetrating Radar (GPR) technology. The GPR survey was conducted to locate potentially buried objects, but variations with GPR antennae were attempted to also define lithology and survey the integrity of the pond liner. A separate report has been prepared for the geophysical survey, but applicable findings from the survey are included in this report. The remaining Solar Ponds contain liquid and they were not inspected during the visual surveys.

2.0 HISTORY AND CONSTRUCTION

Pond 207A is approximately 250 feet by 525 feet at the crest. When operating at its maximum allowable level, the ponds' liquid covers an area approximately 230 feet by 505 feet. This corresponds to a surface area of approximately 116,200 square feet (about three acres). The maximum operating depth is approximately 7-1/2 feet corresponding to a maximum waste volume of about 5,050,000 gallons (Rockwell International, 1988).

Pond 207A was placed in service in August 1956. The original construction consisted of asphalt planking approximately one-half inch thick. Figure 2-1 is a photograph taken in May 1956 which depicts the original liner installation. It is believed that Pond 207A entered service shortly after construction.

Pond 207A was redesigned in November 1963 and the asphalt planking was replaced with approximately a four inch thickness of asphaltic concrete and tack coats. The asphaltic concrete was applied in two 1-1/2 inch lifts, adhered with asphalt tack coat. The slopes of both the pond bottom and the pond sides were significantly modified in this redesign. Based on these modifications, the bottom slope of the pond drained to a sump at the northeast end of the pond, and the side slopes, which had been 1:2, were changed to 1:3.7.

The side slopes of Pond 207A were relined in the Fall of 1988 to repair cracks in the side slopes as part of the closure operations. This relining consisted of a minimum of one-eighth inch thick, rubberized, crack-sealing material laid over the side slopes of the pond. Relining was performed to minimize potential leakage from the pond in preparation for the transfer of pumped-back ground water into the pond for evaporation.

Pond 207A is believed to have contained liquid almost continuously from its redesign and construction in 1963 through pond cleanout in Summer 1988. The pond was believed to have remained dry after cleanout and was exposed to the weather from approximately July 1988 to June 1990. It again held water after June 1990, and then was drained and cleaned in Fall 1992.

3.0 FINDINGS

The liner inspections were conducted in Pond 207A on two separate occasions, on December 9, 1992, and again, on February 26, 1993. The weather conditions during both inspections were cold and clear.

On December 9, 1992 approximately two-thirds of the liner was exposed for visual inspection. The northeast one-third of the pond was covered with ice and snow-covered ice. The pond was inspected by entering the pond from the approximate midpoint of the western edge, walking south to the southern edge, east to the eastern edge, and northwest to the northern end, following the edge of the ice. Several photographs were taken, and color photo copies most representative of pond conditions are in Appendix A. Photograph numbers correspond to the film exposure number, which started at exposure 10.

On February 26, 1993 the pond liner was inspected after the ice and snow-covered ice had melted. The pond was inspected by entering from the midpoint of the western edge, walking toward the northern edge, walking toward the northeastern corner, near the sump and lowest area of the pond, and then walking back and forth between the eastern and western edges of the pond, inspecting all areas previously inaccessible due to ice and snow. The area in the northeastern edge of the pond surrounding the sump was observed to have standing water approximately four inches deep.

Results of the visual surveys are depicted on Figure 3-1. Figure 3-1 is a sketch of the pond which includes approximate locations of cracks, mud-cracked, breached, or bubbled areas, and vantage points from which photographs were taken.

The uppermost layer of pond liner material was observed to be cracked extensively and otherwise deteriorated throughout most of the area inspected. The northeastern one-third of the pond liner exhibiting the least amount of crackling and bubbling, and the western and southern two-thirds of the pond liner and slanting berm slopes exhibiting the most extensive crackling and bubbling. Bubbles and crackling in the liner are believed to be caused by thermal/UV

deterioration during periods when the liner was exposed. Several long continuous cracks were observed in the liner, apparently caused by moving vehicles. Tire track imprints were also observed, but no breaching of the liner was associated with these imprints. Many of the long continuous cracks have deteriorated, causing localized widening and exposing significant portions of the underlying liner. Some of the mud cracks and longer cracks were observed to have soil underneath, although it is unknown if this soil was residual solids in the pond sludge that were unable to be removed during pond cleanout. Mud cracking was observed to be dominant along the slanting berms which had been exposed to the heat of the sun for a longer time.

Visual observations of the Pond 207A liner did not allow conclusive identification of obvious liner breaches because it was unable to be determined if observed cracks extended through the underlying asphaltic concrete. The visual results were therefore compared to results from a pilot geophysical study using GPR technology. The GPR survey was conducted in visually deteriorated and relatively intact areas of the pond, and showed indications both of severe cracks and subsurface liner deterioration in areas visually observed to be deteriorated. In less visually disturbed areas, fewer indications of liner deterioration were noted. Results of the geophysical survey are presented in a separate report, although both this visual survey report and geophysical survey report will be incorporated into the OU4 Phase I RFI/RI Report.

4.0 RECOMMENDATIONS

Borehole locations are specified in the Phase I RFI/RI Work Plan to coincide with cracked and uncracked locations in the liner to investigate the possibility of contaminant migration from the pond sludge and liquids into the subsurface. The visual survey confirmed that there were visibly deteriorated and potentially cracked areas, and the geophysical survey generally confirmed that subsurface deterioration coincided with visual surface deterioration. Based on the visual and geophysical survey, the six proposed borehole locations as shown in OU4 Technical Memorandum No. 1 have been relocated into three of the most damaged locations and into three areas considered to be relatively intact. The resulting borehole locations in Pond 207A are shown on Figure 3-1. These locations supersede those shown in Phase I RFI/RI Work Plan maps and maps in Technical Memorandum No. 1, Vadose Zone Investigation. Relocation of

these boreholes is documented in Technical Memorandum No. 2, Modifications to Field Activities.

5.0 REFERENCES

Rockwell International, 1988. "Solar Evaporation Ponds Closure Plan", U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, July 1, 1988, Volume I.



FIGURE 2-1

POND 207-A ORIGINAL CONSTRUCTION OF ASPHALT PLANKING (MAY 1968)

REVISION: 1

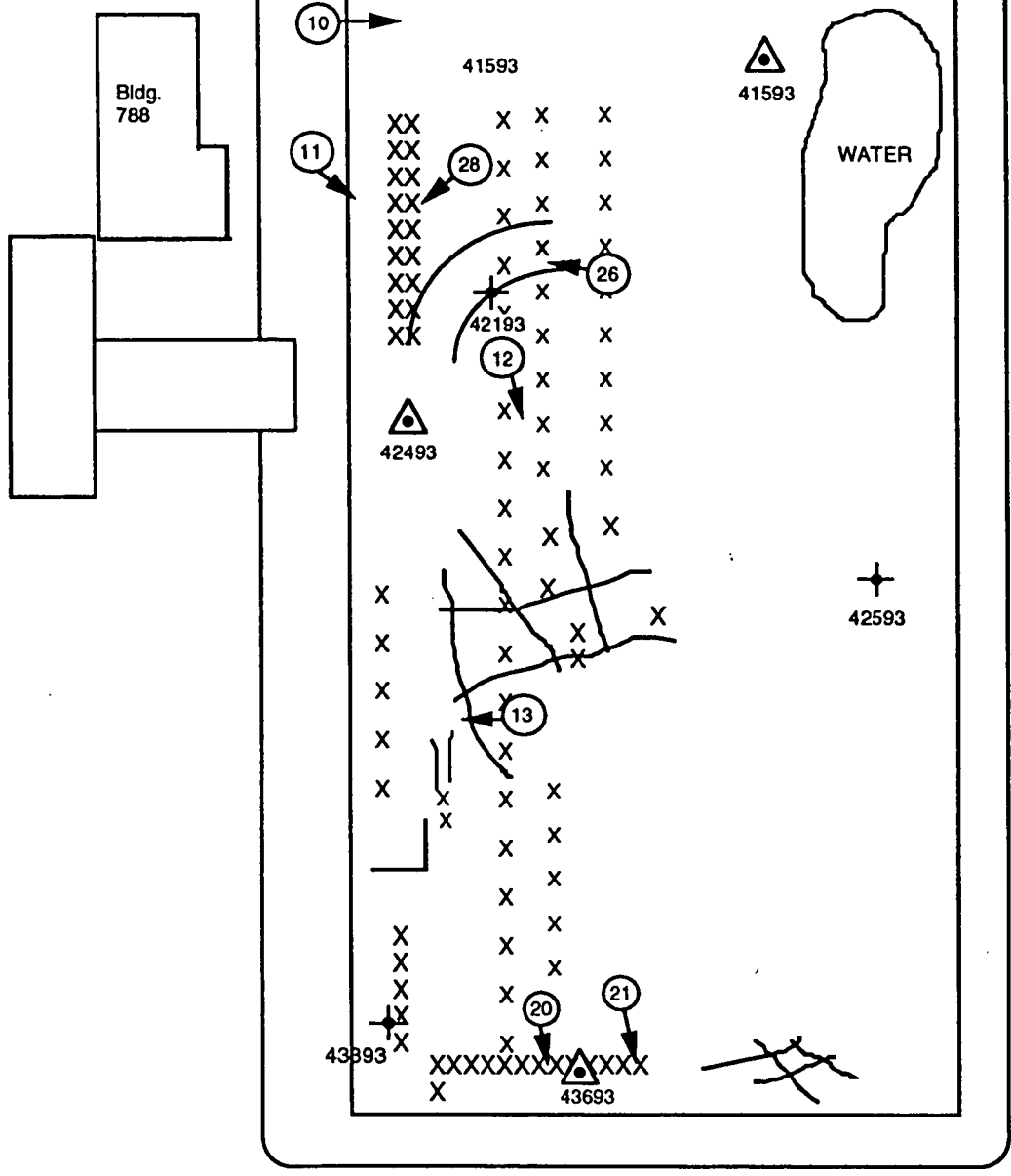
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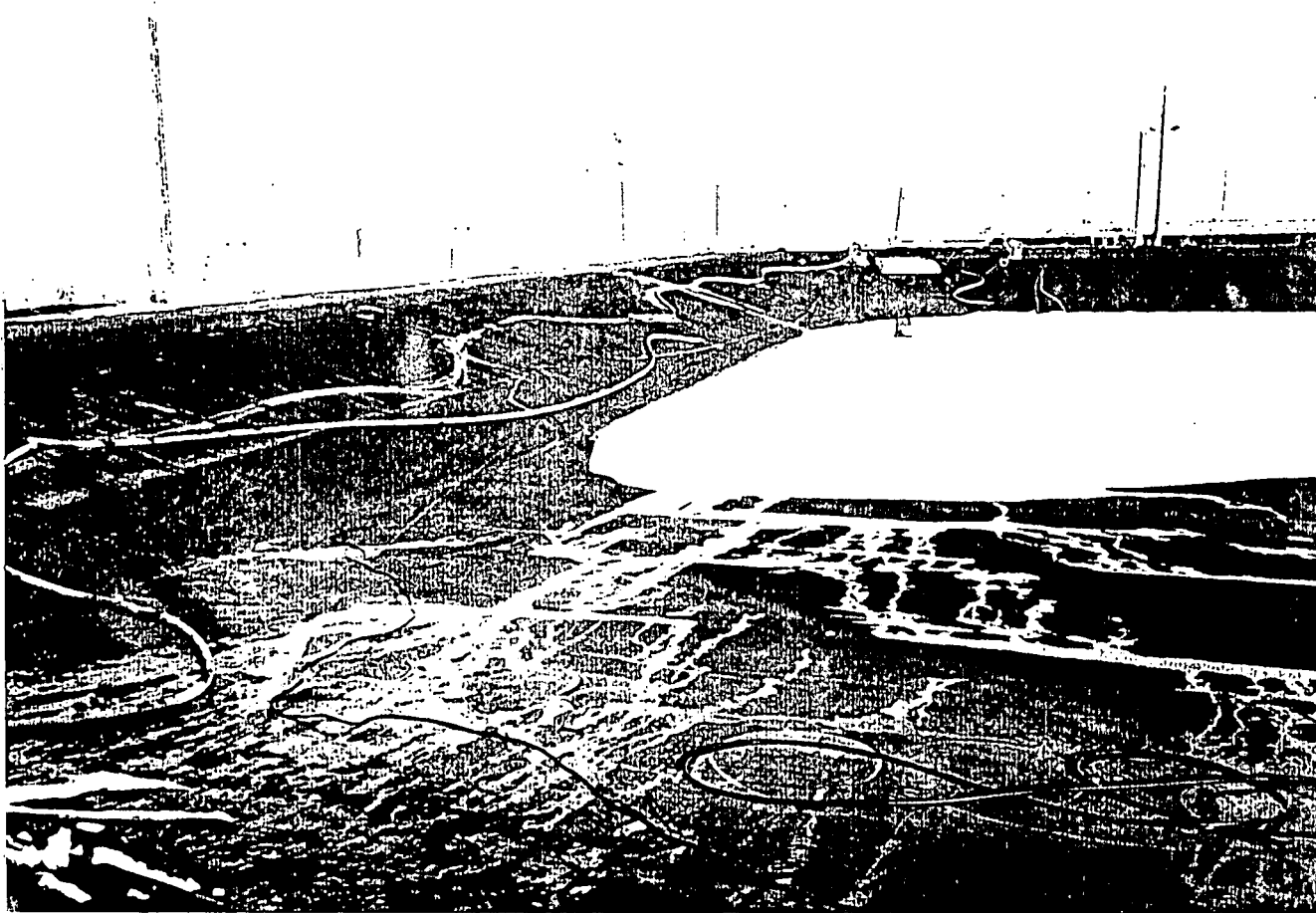
CHECKED BY:



- = Camera Vantage Point and Exposure Number
- = Mud Crack or Bubbling
- = Distinct Individual Crack
- = Proposed Vadose Zone Borehole Location
- = Proposed Borehole Location

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 ROCKY FLATS PLANT
 GOLDEN, COLORADO

FIGURE 3-1
POND 207A VISUAL
INSPECTION
 DECEMBER 9, 1992 and
 FEBRUARY 26, 1993



PHOTOGRAPH NO. 10



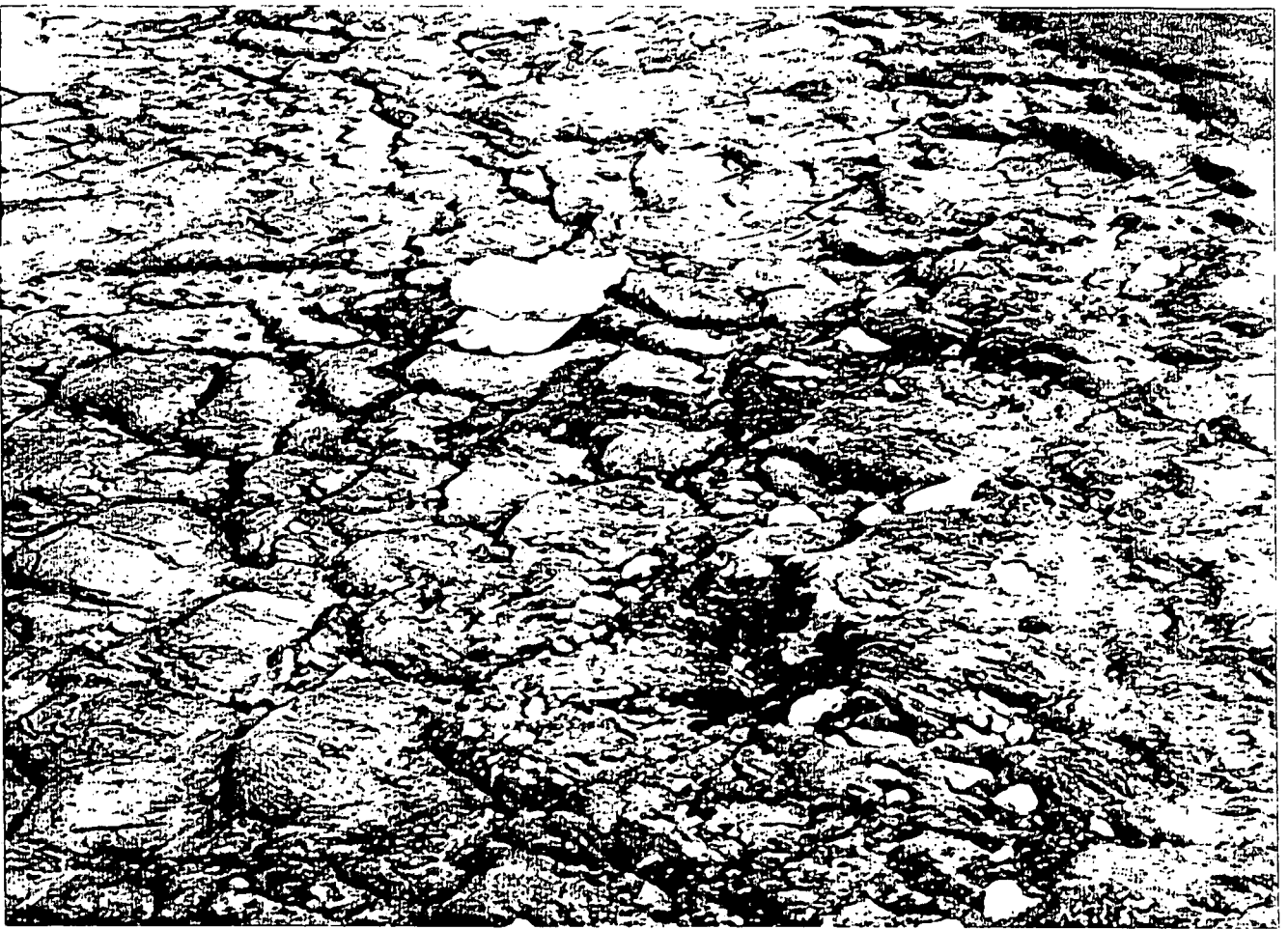
PHOTOGRAPH NO. 11



PHOTOGRAPH NO. 12



PHOTOGRAPH NO. 13



PHOTOGRAPH NO. 20



PHOTOGRAPH NO. 21



PHOTOGRAPH NO. 26



PHOTOGRAPH NO. 28